He pleaded guilty in Justice Court in Whittier on March 4, 1931, and was fined $150. Another druggist, H. A. Ball of Santa Fe Springs, pleaded guilty and was fined $25, as no known cases of paralysis developed from the sales he made.

Jacob Rosenbloom was taken into Municipal Court by the writer, and with the coöperation of the Los Angeles City Prosecutor's Office, was found guilty by a jury of eleven women and one man and sentenced by Judge Ellis A. Eagan on May 16 to one hundred and eighty days in jail and $500 fine, which is the maximum penalty under the law. About fifteen other charges are pending against him in addition to the Federal charge of conspiracy to evade the National Prohibition Act. Up to the date of this paper, May 21, 1931, the only prosecutions which have been made in this state against those selling adulterated fluid extract of ginger, have been made by the Los Angeles County Health Department and convictions have been secured in each case.

Dr. J. L. Pomeroy, with the coöperation of the district attorney's office and State Senator McKinley, succeeded in having this year's state legislature pass a bill requiring a physician's prescription to obtain fluid extract of ginger from a drug store. So far as is known, this is the first and only legislation which has been passed by any state to protect its citizens against "jake paralysis."

The recent outbreak of "jake paralysis" may be said to be an end result of so-called prohibition. Almost all of these cases give a history of having used liquor for many years. When the Volstead Act became a law and they were deprived of their usual toddy or daily drink of whisky, they could not afford to pay bootleggers' prices or buy prescription whisky, so they bought their fluid extract of jamaica ginger for fifty cents a bottle. It was the poor man's way of getting a drink of liquor. As one of these victims told the writer, he was afraid of bootleg liquor but thought it would be safe to buy fluid extract of jamaica ginger, containing 85 per cent alcohol and with the United States Pharmacopeia stamp on the label, from the druggist from whom he had bought drugs for many years. Little did he realize that the bootleggers had taken advantage of the demand for this old household remedy as an alcoholic beverage, and had adulterated it and poisoned it with a ginger substitute, tri-ortho-cresyl-phosphate, in order to make greater money profits. One woman victim had purchased the jamaica ginger extract for stomach cramps and is paralyzed as a result!

Los Angeles County will now have as county charges most of these two hundred "jake" victims for the rest of their lives because they couldn't get along without some form of alcoholic stimulant, even if we do have the Eighteenth Amendment. It needs no great stretch of the imagination to calculate the outlay of the thousands and thousands of dollars which in the course of years the taxpayers will thus be called upon to pay in the care of these now public dependents.

Whittier Health District.

POSTURAL TENSIONS FOR NORMAL AND ABNORMAL HUMAN BEHAVIOR—THEIR SIGNIFICANCE*

PART I

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DISCUSSION *by H. G. Mehrtens, M.D., San Francisco; Walter F. Schaller, M.D., San Francisco.*

THE significance of postural tensions of unstriped and striped neuromuscular reflexes for human behavior is too wide a subject to be covered amply in a single paper.

SCOPE OF THIS PAPER

It is necessary to limit this presentation to the more outstanding functions, applying them to normal and abnormal behavior.

First, we need to abandon the old sterile ways of approaching the riddle of human behavior. We avoid the dilemmas which follow from assuming a psychophysical parallelism; we do not accept the condensed hypothesis of the neurologists who claim that the brain is the organ of the mind; neither do we use the ancient academic theory that there is a mind functioning in reciprocal coöperation with the body. None of these hypotheses gives the medical sciences a way of correlating man's mentation, emotion, and physiology, so that the physician can intelligently treat his cases wherein an organic or functional pathology makes for abnormal behavior, or abnormal behavior produces functional or organic pathology.

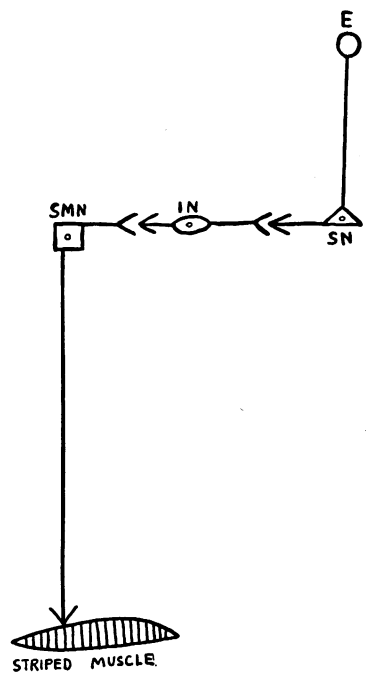

Diagram 1.—Old concept of stimulus and response of motor nerve and muscle without concept of muscle tonus. E, exteroceptor; SN, sensory neurone; IN, intercalated neurone; SMN, somatic motor neurone.

Moreover, we do not care to reduce such functional attributes of the personality as the ego or mentation to physiochemical processes within the nerve cell, for such a process would be like trying to explain literature in terms of letters of the alphabet.

We cannot use Freud's theory of a libido principle because it assumes that the libido principle becomes mysteriously converted into

* Read before the Neuropsychiatry Section of the California Medical Association at the fifty-ninth annual session at Del Monte, April 28 to May 1, 1930.

physical symptoms. It skips over the biological riddle created by a libido-organic version of the ancient mind-body interaction theory.

The biologic evolution of man from lower animal forms to the present level requires that we develop a biologic comprehension which is capable of explaining all of man's personal attributes. We use a new conception of the sensorimotor reflex circuit with which we may explain the principle of postural tensions of the striped and unstriped muscular systems which underlie normal and abnormal behavior.

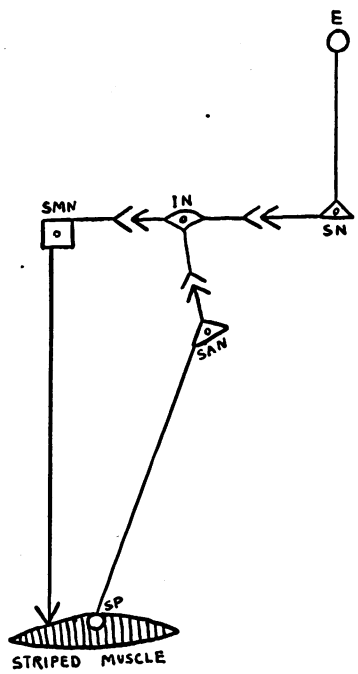

Diagram 2. — New concept or stimulus and motorsensory circuit in continuous but variable tonus responding as a group. E, exteroceptor; SN, sensory neurone; IN, intercalated neurone; SMN, somatic motor neurone; SP, somatic proprioceptor; SAN, somatic afferent neurone.

The old concept of a reflex arc, which seems to have been theoretically developed on the idea of stimulus and response, without adequate physiological data, has proven wholly useless for building up an understanding of human behavior which has any clinical value.

COMMENT ON DIAGRAMS

In the Diagram 1, illustrating the old concept of stimulus and response, we see human behavior amounting to little more than a living organism reacting like a typewriter to an endless stream of environmental stimuli.

Diagram 2 illustrates in a simplified form the principle of the new concept of a reflex sensorimotor circuit, in which the muscle cell is shown in continuous tonus with its motor nerve cell, so that motor impulses to the muscle cell from the motor nerves not only stimulate its contractions, but also its postural tonus; and the proprioceptive stimuli originating from the working muscle cell finally restimulate its own motor nerve through its proprioceptive sensory nerve, thereby completing a circuit.

(The concept of a constantly repeating efferent-afferent-efferent neuromuscular reflex circle maintaining postural tonus, which may be stimulated by an exteroceptive afferent impulse into an overt movement, was derived from Sherrington's work on Postural Tonus of Muscle and Nerve, Brain, Vol. 38, Part 3, 1915. The value of the concept of the proprioceptive component and postural tonus of the neuromuscular reflex circuit for explaining many fundamental problems in behavior, which were otherwise inexplicable, was emphasized in my Autonomic Functions and the Personality, 1918. Since this publication, I have found that Bok, in 1917, referred to by Holt in Animal Drive and the Learning Process, Vol. I, 1930, also gave early emphasis to the importance of using the concept of reflex circles instead of the old concept of reflex arc.)

Diagram 3 illustrates the relationship between unstriped, autonomic sensorimotor reflex circuits and striped, so-called voluntary, sensorimotor reflex circuits. This diagram is also used to illustrate the intimate reciprocal relationship which we know must exist between the two muscular systems, from abundant anatomic, physiologic, clinical pathologic, psychologic and psychopathologic observations.

Diagram 3 illustrates the postural tonus of the autonomic unstriped muscle cells which include all of the muscular viscera, the heart, and the arterial and capillary vessels, and which through vasomotor influences determine largely the activity of the glands of external and internal secretion. It illustrates the intimate reciprocal influence of the tonus of the autonomic system upon

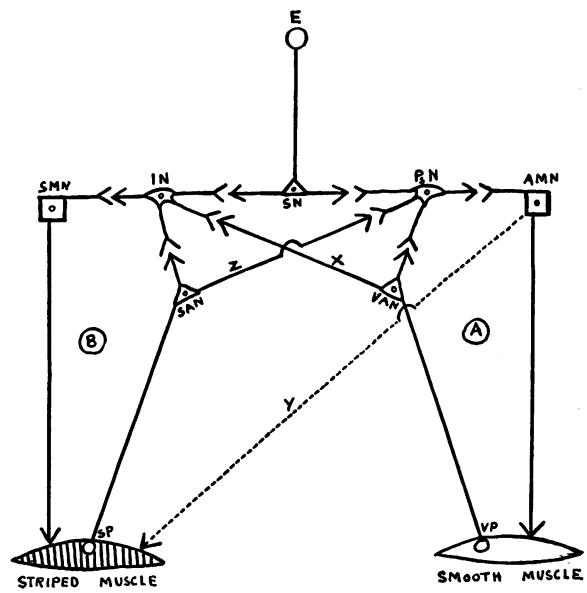

Diagram 3.—New concept diagrammatically presented to show the influence of the tonus of the unstriped sensorimotor reflex circuit (A) upon the tonus of the striped muscle circuit (B). E, exteroceptor; SN, sensory neurone; IN, intercalated neurone; SMN, somatic motor neurone; SP, somatic proprioceptor; SAN, somatic afferent neurone; PgN, preganglionic neurone; AMN, autonomic motor neurone; VP, visceral proprioceptor; VAN, visceral afferent neurone.

The postural tonus of the unstriped reflex circuit (A) influences the postural tonus of the striped muscle reflex circuit (B), through X and probably Y. Reciprocally B has some influence upon A through Z. The influence of the external stimulus at E is qualified by the kinesthetic stream from the muscle set of A and B. The reactions of A are a resultant of its own state of tonus plus the stimuli from E plus the stimuli from B. Thus, a man, in the face of a dangerous situation at E, by keeping up a resistive attitude, may prevent himself from becoming too frightened by the situation to meet it safely. (No attempt is made in this diagram to show association paths and higher central connections which have their final organization through the paleoncephalon.

(The actual mechanism by which the autonomic nervous system influences the tonus of striped muscle is still physiologically and anatomically unsettled. It seems to be generally accepted at present that the autonomic efferent component represented by line Y in Diagram 3 goes to the striped muscle field, but it is questioned as to whether the nerves end in the striped muscle cells or in the unstriped muscle cells of the finer arterioles—somehow to have an influence upon the nutrition and tonus of the striped muscle cell. These incompletely understood factors, while important for physiology, are not deterrents from using the valuable concept of the interrelation of autonomic neuromuscular tonus with cerebrospinal neuromuscular tonus as a basic factor in human and other animal behavior.)

the striped muscular system, and shows how the striped muscle system may influence the autonomic system.

It is at once apparent to anyone having medical knowledge that the functioning of the nerve and muscle cells of the dual reflex circuits in everyday life must be greatly affected by their nutritional or physiochemical states as well as their organic constitution. Hence metabolism, endocrine secretions, any form of intoxication (infectious disease, exhaustion or chemical), must affect the integrity and strength and weakness of their functioning.

This conception of the sensorimotor reflex circuit, we wish to show, contains all the factors necessary to bring the various branches of the medical sciences into a coöperative working relationship with psychopathology and psychology.

We will now try to apply the functional implications of this concept to those aspects of human behavior which are particularly important to the physician, surgeon, and psychopathologist.

POSTURAL TENSION IN RELATION TO MOVEMENT

Postural tonus, as it is used here, does not mean the position which the organ or limb may assume through the contraction or relaxation of the muscles, but it means the quality of firmness or laxity of the tone of the hollow muscular viscera as they hold their contents, or of the skeletal muscles as they hold the skeletal frame against the pull of gravity. This tonus makes the basis for muscular contraction and relaxation, but is not the act of overt movement itself. To illustrate: When we are in good confident spirits we find we move easily, firmly, with little fatigue. When we are discouraged and sad we make the same movements with very different muscle tonus, and this shows in our drooping posture. We are not concerned here about sadness making the drooping tonus or the drooping tonus making sadness or what nutritional, endocrine, environmental factors make either sadness or drooping tonus. We are now concerned with the fact that the muscle tonus, whatever it is and whatever mood is involved with it or however it comes, makes the basis for movement and determines its quality for effectiveness. This tonus also influences our reactions to stimuli, hence influences externally and internally aroused sensation. When the surgeon holds his needle to sew delicate tissues, his capacity for making skillful movements depends upon the autonomic-affective tonus of his grip on the instrument. If too tense or too soft, the skill of movement and touch will be impaired. This basic quality applies to every skillful thing we try to do in life.

The tonus of the neuromuscular circuit may vary from pathologic hypertension to a pathologic hypotension, such as we find in spastic and flaccid conditions of the muscular viscera. Between these extremes there is a range of tonus which is best suited for man's vast varieties of skillful, powerful movement, without discomfort. Too much tension makes movement painful and difficult; too little tension makes our movement weak and difficult. Both extremes are ineffective and distressing. In some conditions hypertension, in others a mean tension, and in still others hypotension are best suited to meet conditions of particular situations. For instance, in emergencies some degree of hypertension is more effective than a relaxed, indifferent status; and conversely, hypertension in an easy situation would be disadvantageous, if not very pathological. But in the general routine of everyday life there is a state of tonus which is more effective, and this status every person must find and maintain.

The degree of tonus is the basis for overt action to a situation. Apply the same situation to different degrees of tonus and we have different kinds of overt adaptation. When we react one way to a situation at one time, and quite differently to a similar situation upon another occasion, we find that our postural tonus or attitude has been very different.

Diagram 3 does not show association paths of individual reflex units with others. Obviously there is an extensive system of integrations which weaves them into a great working unity. We need to recognize, in order to complete our picture, that all neuromuscular segments are rarely ever in the same degree of tension, but that usually some segments are in states of hypertension and others quite relaxed, according to the environmental conditions and the affective and metabolic status of the organism. If we will observe ourselves we can easily feel these shifts of tension occurring within us as our emotions and conscious interests change; as, for instance, from pleasureful, playful interests to serious or dangerous work. We can feel changes occurring as we get hungry, famished, thirsty, cold or hot, tired, go to sleep, or get into heated arguments or accept delightful personal relations. In other words, metabolism, environment, emotion, and mentation influence our postural tensions; and reciprocally, our postural tensions influence our reactions to these internal and external influences.

Our postural tensions in our various visceral and skeletal segments, working as a unity, make up our characterologic attitudes toward our own inner capacities and our external situations, particularly our personal relations. We all know that our attitudes toward a situation determine the way we will think about it, whether we will dislike or like it, coöperate or resist it, etc. We all have experienced the feeling of having a resistant, firm postural tonus persuaded to change to a more relaxed, giving-in quality, and the reverse.

There are still additional factors we need to bear constantly in mind if we wish to have a comprehensive understanding of human behavior for clinical purposes.

No living thing can live for any length of time independently of its environment, and we need to overcome our illusion of personal autonomy. We are constituted of the forces which constitute our environment, and every momentary state of our being (behavior, affectivity, mentation) is dependent upon the forces within us and around

us. Our sensorimotor reflexes are inextricably dependent upon environmental stimuli; hence, whenever we consider the clinical meaning of tensions of a patient's organs we must consider them in relation to his feelings and beliefs about his environmental situation, particularly his personal relations and the nature of these relations.

Through countless repetitions of situations from birth onward, probably all our reflexes have become conditioned to environmental stimuli, so that we are not only incapable of developing any truly independent actions or thoughts, but much of our behavior follows well-defined patterns in a well-defined environment.

I also want to emphasize here the law of neutralization of affective pressure in relation to postural tensions; that, namely, whatever variations of our affective pressure may be developed, whether love, fear, hate, shame, sorrow, or jealousy, they force us to get from our particular environment (or create in it) situations which will counterstimulate us and neutralize these variations until we return to a state of comfortable equilibrium. If we are hypertense and too excited, we need soothing stimuli; and when hypotense we need exciting stimuli. As fast as we build a well-balanced eurythmic status, our environment (particularly our personal relations) and our metabolic functions disturb it and require us to keep on building to the end.

There is, then, an intimate relationship between our emotions, or rather the emotional variations of our stream of affective pressure, and the postural tensions of our vital organs. We are not concerned here as to which is primary and which is secondary. We do know from such experiments as Cannon's and Sherrington's, from clinical symptoms and physiologic functioning in psychopathologic cases, that postural tensions of the viscera form a basis for the quality and quantity of our various emotional reactions, and our emotional reactions certainly influence our visceral tensions and their vital functions. We need but call attention to the relations of hyperthyroidism and fear; how hyperthyroidism increases fearfulness, and fright increases hyperthyroidism.

(To be continued)

ORGANIZED TROPICAL MEDICINE IN THE WESTERN UNITED STATES*

By ALFRED C. REED, M. D.
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DISCUSSION *by John Martin Askey, M. D., Los Angeles; Robert A. Peers, M. D., Colfax; Alanson Weeks, M. D., San Francisco.*

TROPICAL medicine means the practice of preventive and clinical medicine in warm climates. The term is inexact and unsatisfactory and yet it is the best available. All disease processes are modified by climatic conditions, especially by those climatic elements which are associated usually with the tropics. This means chiefly increased mean temperature, low barometric pressure, and either excessive dryness or excessive moisture. The degree and character of insolation play an important part. Social and sanitary conditions of native races must be considered. Local food supply and food habits, and religious beliefs affecting health are all included. The reaction of all these factors concerns the physician, first in relation to the local or native inhabitants, and second, in relation to foreigners.

SCOPE OF TROPICAL MEDICINE

Tropical medicine is characterized by certain indirect results of warm climates also. Here the insect life is overabundant and furnishes many problems both as vectors and as disease causers which are radically different from those of cooler climates. Poisonous animals and fish are more abundant and in closer contact with human beings under less controlled conditions. Bacteria flourish and take on characteristics which modify disease processes and at the same time means and opportunity for transfer of infection are different and easier. Large populations are either so crowded that health conditions are affected or so primitive that disease prevention becomes difficult or impossible. Poverty, overcrowding, ignorance, and local medical systems completely change the practice of both clinical and preventive medicine. Absence of sanitation and hygienic ideas modify disease control and even the nature of disease.

Tropical medicine also includes diseases and conditions which are to us exotic and which, while thriving primarily in warm climates, are also acclimated and more or less endemic in cool or temperate climates. The term thus includes medical practice in Asia and parts of the Orient which are not strictly in the tropic belt.

THE DEFINITION AS APPLIED TO WESTERN UNITED STATES

With such a definition of tropical medicine it is evident that we have in the western United States many tropical diseases which are endemically established. Examples of these are seen in tularemia, Rocky Mountain fever, coccidioidal granuloma, torula, plague, bacillary dysentery, amebiasis and intestinal parasitic affections, liver abscess, trichinosis, pellagra, beriberi, various ringworm infections, undulant fever and malaria. The entire index of tropical diseases, with the possible exception of trypanosomiasis, may be seen sporadically at any time by any physician. Filariasis of various forms, sprue, blood and intestinal flukes, leprosy, dengue fever and yaws are met with occasionally now.

One other feature of tropical medicine, too often ignored in all our medical teaching, is human geography. Space forbids discussion of this fascinating and invaluable field of science. It bases itself on the conception that, just as the earth geographically is a unity made up of many interrelated parts, so is humankind a unity, closely interrelated, and separated, drawn together and, to a surprising degree, controlled by geographic environment. Man in relation to

* From the Pacific Institute of Tropical Medicine of the University of California.
* Read before Western Branch of American Public Health Association at Salt Lake City, June 12, 1930.